



INTRODUCTION  

---

TO USRA  

---

---

UNIVERSITIES  

---

SPACE  

---

RESEARCH  

---

ASSOCIATION  

---

---



# TABLE OF CONTENTS

---

LETTER FROM THE PRESIDENT.....	2
INTRODUCTION.....	3
CORPORATE ADMINISTRATION.....	4
CORPORATE OFFICERS.....	5
CORPORATE OFFICES.....	6
<b>INSTITUTES, DIVISIONS, CENTERS, AND PROGRAMS</b>	
Center for Advanced Space Studies (CASS).....	7
Lunar and Planetary Institute (LPI).....	8
Exploration Science Institute (ESI).....	10
Division of Space Life Sciences (DSLS).....	12
Division of Educational Programs (DEP).....	14
Institute for Computer Applications in Science and Engineering (ICASE).....	16
Research Institute for Advanced Computer Science (RIACS).....	18
Center of Excellence in Space Data and Information Sciences (CESDIS).....	20
Division of Microgravity Science and Applications.....	22
Institute for Global Change Research and Education (IGCRE).....	24
Earth Sciences Programs.....	26
Division of Astronomy and Space Physics.....	28
Visiting Scientist Program at the NASA Goddard Space Flight Center.....	32
<b>MEMBER INSTITUTIONS.....</b>	<b>34</b>
<b>USRA GROWTH RECORD.....</b>	<b>35</b>
<b>BOARD OF TRUSTEES.....</b>	<b>36</b>
<b>COUNCIL OF INSTITUTIONS.....</b>	<b>37</b>
<b>SCIENCE COUNCILS.....</b>	<b>38</b>
<b>USRA OFFICES.....</b>	<b>40</b>

## USRA 25 YEARS — A LETTER FROM THE USRA PRESIDENT

---

The Universities Space Research Association (USRA) was founded on March 12, 1969, a little more than four months before Neil Armstrong took “one small step” onto the Moon. The initial assignment of the fledgling consortium of forty-nine universities was to manage the access of the worldwide community of scientists to the samples of lunar rock and soil collected by Apollo astronauts.

Now in our 25th year, with seventy-six institutional members, we look back with pride over a quarter-century of achievement in partnership with the university community. USRA scientists and engineers have worked in almost every specialty of space-related research and technology development in collaboration with government and academic scientists. Our Lunar and Planetary Institute has achieved preeminence in solar system research; our institutes for computational methods and computer science, ICASE, RIACS, and CESDIS, are recognized world-wide. Our educational programs have touched students and faculty at hundreds of colleges and universities, including historically Black and Hispanic institutions.

As we look to the future, we see a limitless potential for advances in space science and aerospace technology, and there is much that USRA can do to contribute. Together with our partners in the academic world, we are working to extend and strengthen our programs in space-related science and engineering. In addition, we are encouraging the incorporation of smaller missions into the nation’s space program, in order better to match the traditional processes of research and development in university settings, and to support the hands-on participation of students and entry-level professionals.

We continue our efforts to enhance our service to the university community, not only through exchange and visitor programs, but also through the sponsorship of collaborative research. Last, but not least, we are expanding our highly successful educational programs by developing exciting course offerings keyed to the intellectual appeal of aerospace endeavors.

I am deeply proud of our record, and I consider myself fortunate to be a member of the USRA team.



Paul J. Coleman, Jr.

President

## INTRODUCTION

---

The Universities Space Research Association was incorporated 25 years ago in the District of Columbia as a private nonprofit corporation under the auspices of the National Academy of Sciences. Institutional membership in the Association has grown from 49 colleges and universities, when it was founded, to 76 in 1993. All member institutions have graduate programs in space sciences or aerospace engineering. Besides 72 member institutions in the United States, there are two member institutions in Canada, one in England, and one in Israel.

USRA provides a mechanism through which universities can cooperate effectively with one another, with the Government, and with other organizations to further space science and technology, and to promote education in these areas. Its mission is carried out through the institutes, centers, divisions, and programs that are described in detail in this booklet. Administrative and scientific personnel now number about 400. A unique feature of USRA is its system of Science Councils, which are standing panels of scientific experts who provide program guidance in specific areas of research. Most of USRA's activities are funded by grants and contracts from the National Aeronautics and Space Administration.

USRA began its quarter century of leadership with the administration of the Lunar Science Institute. Founded by the National Academy of Sciences to manage research access to lunar specimens, the Lunar Science Institute

became the Lunar and Planetary Institute, which has achieved eminence in planetary and solar system science. USRA promotes advanced research in the science of computing through the Institute for Computer Applications in Science and Engineering (ICASE) at NASA Langley Research Center, the Research Institute for Advanced Computer Science (RIACS) at the NASA Ames Research Center, and the Center of Excellence in Space Data and Information Sciences (CESDIS) at the NASA Goddard Space Flight Center. Completing its broad research program, USRA sponsors scientists who collaborate with government researchers in space life sciences, microgravity science, astronomy and space physics, and earth sciences. Each year, USRA sponsors many meetings, short courses, symposia, and workshops. Student involvement and educational enrichment programs are the focus of the Division of Educational Programs, and are important elements in all of USRA's activities.

Three scientists have served as president of USRA: Dr. A. Robert Kuhlthau (1969-1976), now retired from the University of Virginia; Dr. Alexander J. Dessler (1976-1981), who recently retired from Rice University to the University of Arizona; and Dr. Paul J. Coleman, Jr. (1981-present), who is Professor of Space Physics at the University of California, Los Angeles.

# CORPORATE ADMINISTRATION

---

## **COUNCIL OF INSTITUTIONS— CORPORATE AUTHORITY**

The corporate authority of the Association is vested in its member universities, each of which appoints a representative who serves on USRA's Council of Institutions. Each year, the Council meets on the last Friday of March, in Washington, D.C. At this annual meeting, the Council reviews the progress of the Association, provides policy guidance to the Board of Trustees, elects members to the Board, and handles such other business as required.

## **BOARD OF TRUSTEES— CORPORATE POLICY**

USRA's Board of Trustees is responsible for setting corporate policy. One board member is selected from each of nine geographical regions, a procedure that assures broad geographical representation. Each regional trustee is a faculty member or administrative officer at a member university. In addition there are three at-large members, nominated by the Council. Trustees serve three-year terms. The chair of the Council of Institutions and the president of USRA serve as *ex officio* members of the Board of Trustees. The Board has three scheduled meetings during the year. The Board appoints the officers of the Association, and

sets corporate policy. Matters relating to science and technical management are normally delegated to the Science Councils.

## **SCIENCE COUNCILS—SCIENCE POLICY**

Each institute or program of USRA is overseen by a Science Council that serves, in effect, as a scientific board of directors. Each Science Council provides guidance in the discipline area for which it is responsible. Members are appointed to three-year terms by the Board of Trustees on the basis of their scientific expertise, and their standing within the academic community. Science Councils meet two or three times each year.

## **USRA HEADQUARTERS— CORPORATE MANAGEMENT**

USRA Headquarters is responsible for the administration of the Association. It handles corporation-wide matters such as retirement and insurance programs, fiscal ledgers, payroll and voucher payments, contract negotiation and reporting. The Association uses the TIAA-CREF retirement plan. New York Life Insurance Company is the principal carrier for health and dental, life, and long-term disability coverages. Fiscal records are audited by Ernst & Young prior to government audit by the Defense Contract Audit Agency. Hay Associates advises USRA

---

## CORPORATE OFFICERS

---

Headquarters on salary administration to assure an equitable and competitive salary structure. Since its inception, USRA has retained as its corporate counsel William J. Butler, Jr., Esq., who is a partner in the Washington law firm of O'Brien, Birney and Butler. USRA is an Equal Opportunity, Affirmative Action Employer.

### **INSTITUTES, DIVISIONS, CENTERS, AND PROGRAMS—OPERATIONAL MANAGEMENT**

Operational management of each administrative unit of the Association is delegated to a director who serves as chief administrative officer. The director has responsibility for staffing and administration under the direction of USRA Headquarters, and for providing scientific management under the guidance of a cognizant Science Council.



**Dr. Paul J. Coleman, Jr.**  
President

Paul J. Coleman, Jr. graduated from the University of Michigan in 1954.

He received the M.S. degree in physics from Michigan in 1958. Following a tour of duty at NASA Headquarters as head of the interplanetary sciences program, he joined the research staff of the University of California, Los Angeles (UCLA). He received his Ph.D. in space physics from UCLA in 1966. He has twice received the NASA Exceptional Scientific Achievement Medal.

Dr. Coleman was appointed USRA President in 1981. He continues to serve on the UCLA faculty as Professor of Space Physics and staff member of the Institute of Geophysics and Planetary Physics.



**Dr. W. David Cummings**  
Executive Director  
Secretary/Treasurer

W. David Cummings received his Ph.D. in space science in 1966 from Rice University, and subsequently joined the UCLA faculty as an assistant professor. Dr. Cummings was Chair of the Physics Department of Grambling State University from 1969 until 1976, when he was appointed USRA Executive Director. His primary research interest is space plasma physics.

## CORPORATE OFFICES

---

### HEADQUARTERS OFFICE

The USRA Headquarters Office in Columbia, Maryland is responsible for the administration of the Association. The Headquarters Office performs functions that are handled on a corporation-wide basis such as retirement, maintenance of fiscal ledgers, payroll, contract negotiation, and contract reporting. USRA Headquarters is the office of the USRA Executive Director.

#### **Dr. W. David Cummings**

Executive Director



**Ms. Sheila Del Favero**

Chief Financial Officer



**Ms. Beverly C. Johnson**

Procurement Officer

USRA Headquarters  
10227 Wincopin Circle, Suite 212  
Columbia, MD 21044

(410) 730-2656 • FAX: (410) 730-3496

Internet: [info@hq.usra.edu](mailto:info@hq.usra.edu)

### WASHINGTON OFFICE

The USRA Washington Office, which is located in proximity to NASA Headquarters, provides space for several USRA programs and also houses the USRA boardroom and president's office. The boardroom and other meeting support facilities are used by USRA and NASA for meetings and conferences. The programs operated within the Washington Office enable university-based researchers to work with colleagues at NASA Headquarters. The office provides a variety of computing resources and has a high-speed connection to the Internet.

USRA

300 D Street, SW, Suite 801

Washington, DC 20024

(202) 479-2609 • FAX: (202) 479-2613

Internet: [postman@usra.edu](mailto:postman@usra.edu)

---

### BOULDER OFFICE

USRA maintains a small office in Boulder, Colorado to publish the *USRA Quarterly*, the annual *Introduction to USRA*, and to undertake special projects.

USRA

1050 Walnut Street, Suite 212

Boulder, CO 80302

(303) 440-9160 • FAX: (303) 440-1421

Internet: [mhdavis/usra@telemail.nasa.gov](mailto:mhdavis@usra@telemail.nasa.gov)

[davismh@spot.colorado.edu](mailto:davismh@spot.colorado.edu)



---

CENTER FOR

---

ADVANCED

---

SPACE

---

STUDIES

---

---

---

---

---

---

---

---

**CENTER FOR ADVANCED SPACE STUDIES**

The Center for Advanced Space Studies (CASS) is a major research and conference facility built by USRA in 1991 on a nine-acre parcel of land adjacent to the Clear Lake Campus of the University of Houston, near NASA's Johnson Space Center.

Since the completion of the CASS facility in December 1991, it has housed the three Houston activities of USRA: the Lunar and Planetary Institute (LPI), the Division of Space Life Sciences (DSL), and the Division of Educational Programs (DEP). In 1993 it also became the home of the new Exploration Science Institute (ESI). In addition to providing office space for scientists, visitors, and administrative staff, CASS is used extensively as a meeting center and provides the supporting services of a publications department, a computer center, and an extensive collection of lunar and planetary literature and imagery.

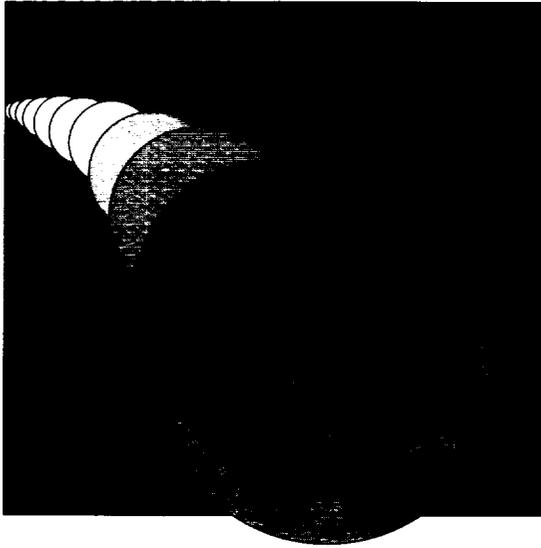
Center for Advanced Space Studies

3600 Bay Area Blvd.

Houston, TX 77058

LPI/ESI: (713) 486-2139 • FAX: (713) 486-2162

DSL/DEP: (713) 244-2000 • FAX: (713) 244-2006



---

# LUNAR AND

---

# PLANETARY

---

# INSTITUTE

---

---

---

---

---

---

---

---

---

The Lunar and Planetary Institute (LPI) was established in 1968 as the Lunar Science Institute. The LPI is now a focus for academic participation in studies of the current state, evolution, and formation of the solar system. The Institute is housed in the USRA Center for Advanced Space Studies, a facility located on nine acres adjacent to the campus of the University of Houston-Clear Lake and near the NASA Johnson Space Center. The Institute includes a computing center, extensive collections of lunar and planetary data, an image-processing facility, an extensive library, publishing services, and facilities for workshops and conferences. Over 100 workstations are connected to the LPI local area network, which consists of a Stardent 3000 VS graphics supercomputer, several SUN sparstations, and three MicroVAX computers. Access to the Johnson Space Center Cray X-MP/464 is provided via the NSI network. LPI facilities are available for use by members of the lunar and planetary science community and other qualified users. The LPI is a node on the NASA Regional Planetary Image Facility.

Current major LPI research topics include:

- The origin and early evolution of the solar system
- Studies of the Moon, meteorites, and the Earth
- The outer solar system with emphasis on studies of icy satellites

---

Institute researchers and academic colleagues in the United States and Mexico recently found that the Chicxulub impact basin in Yucatan is larger than previously estimated and was formed 65 million years ago.

The LPI manages a wide variety of workshops, conferences, seminars, and working groups during the year, and has been effective in leading large-scale interdisciplinary study projects. Major conferences and workshops sponsored or cosponsored during 1993 included the 24th Lunar and Planetary Science Conference; Workshop on Advanced Technologies for Planetary Instrumentation; Workshop on the Analysis of Interplanetary Dust Particles; Conference on Asteroids, Comets, and Meteors; MSATT (Martian Surface and Atmosphere Through Time) Workshop on Atmospheric Transport on Mars; 56th Annual Meteoritical Society Meeting; MSATT Workshop on Early Mars: "How Warm and How Wet?"; MSATT Workshop on the Martian Northern Plains: Sedimentologic, Periglacial, and Paleoclimatic Evolution; Division for Planetary Sciences 25th Meeting; MSATT Workshop on Mars: Past, Present, and Future — Results from the MSATT Program; and Workshop on Particle Capture, Recovery, and Velocity/Trajectory Measurement Technologies.

In 1993, the scientific staff of the LPI consisted of ten staff scientists and six long-term visitors. In addition, there were 27 participants in the LPI summer intern and visitors program.



**Dr. David C. Black**  
Director

David C. Black received his Ph.D. in physics from the University of Minnesota in 1970. He joined the NASA Ames Research Center in 1970, and between 1970 and 1988 held posts at Ames and at NASA Headquarters. In 1985, he became the first Chief Scientist for the Space Station Program, and in 1987 became Chief Scientist for Space Research at Ames. He left NASA in 1988 to head the USRA Lunar and Planetary Institute. Dr. Black is internationally recognized for research in theoretical astrophysics and planetary science. He also is Director of the Exploration Science Institute.



**Ms. Helene M. Thorson**  
Assistant Director

Lunar and Planetary Institute  
Center for Advanced Space Studies  
3600 Bay Area Blvd.  
Houston, TX 77058-1113

(713) 486-2139 • FAX: (713) 486-2162  
Internet: [lpi@cass.jsc.nasa.gov](mailto:lpi@cass.jsc.nasa.gov)



---

EXPLORATION

---

SCIENCE

---

INSTITUTE

---

---

---

---

---

---

---

---

---

The Exploration Science Institute (ESI), USRA's newest research institute, was founded in May 1993 to support NASA's interest in the eventual human exploration of the Moon and Mars. The ESI will be staffed with scientists from academic and research institutions in the United States and abroad, and will provide facilities for visitors and guest investigators. Other activities will include organization of workshops, symposia, and short educational courses as a part of an outreach program to communicate the objectives, plans, and results of NASA's manned exploration program to the public and to appropriate universities and other institutions.

The Institute provides an academic atmosphere that serves as a focal point for exploration science activities and information exchange between scientists and engineers involved in human exploration missions. The ESI will engage in and support research in geological and geophysical analysis of global data sets for the Moon and Mars. ESI scientists will use multivariate data sets to assist in the location and characterization of locales appropriate for human exploration, and develop concepts for the analysis of data from experiments and facilities placed on the surface, as well as outward-looking observatories for astronomical and space physics studies.

---

Other activities will include analysis of scientific results from research in life sciences, excluding medical or psychological research.

The Institute will prepare reports, facilitate publication of scientific results, carry out technical evaluations and reviews, and act as an international focus for activities that relate to exploration science. The ESI will serve NASA as the principal repository for public access and distribution of data obtained through NASA's efforts in human exploration and development of space.

The Exploration Science Institute is located at the Center for Advanced Space Studies.



**Dr. David C. Black**

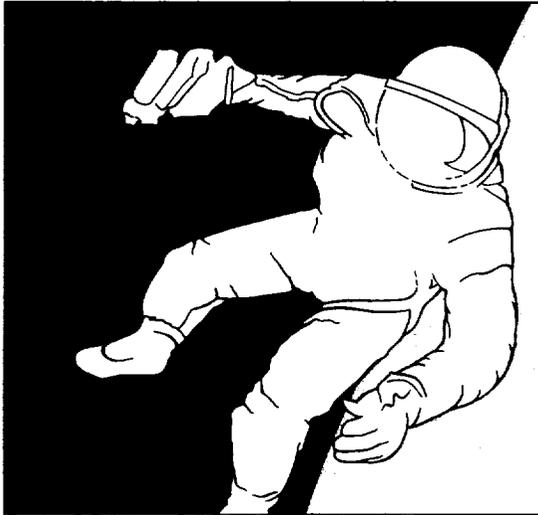
Director

David C. Black is also Director of the Lunar and Planetary Institute.

Exploration Science Institute  
Center for Advanced Space Studies  
3600 Bay Area Blvd.  
Houston, TX 77058-1113

(713) 486-2139 • FAX: (713) 486-2162

Internet: [esi@cass.jsc.nasa.gov](mailto:esi@cass.jsc.nasa.gov)



---

# DIVISION OF

---

# SPACE

---

# LIFE SCIENCES

---

---

---

---

---

---

---

---

USRA's Division of Space Life Sciences (DSLS) was established in 1983 as the Division of Space Biomedicine to facilitate the participation of the university community in biomedical research programs at the NASA Johnson Space Center (JSC). The DSLS, located at the Center for Advanced Space Studies, provides administrative staff and visiting scientists for JSC, and organizes workshops, conferences, and seminars. The Division also supports research at more than 20 outside institutions that are engaged in NASA programs.

The broad-based research and educational programs of the DSLS encompass the following areas:

- Cardiovascular Physiology • Radiation Sciences
- Exercise Physiology • Human Factors
- Bone and Muscle Physiology • Pharmacology
- Neuroscience • Biotechnology
- Computer Modeling of Physiological Systems

The DSLS provides administrative support for the recently established Space Medicine Postdoctoral Training Program with the Johnson Space Center and the University of Texas Medical Branch in Galveston. In July 1993, two Fellows began as the first participants in this two-year multidisciplinary program which seeks to prepare specialty-trained physicians to become accredited experts in space medicine and space biomedical research. The DSLS has provided continuing support of the Neurolab Science Working Group as it prepares to

study neurological processes in spaceflight. A Shuttle Neurolab Mission is scheduled for the mid-to-late 1990s.

During 1993, the DSLS sponsored 12 scientists and research staff members, and 30 consultants. It also provided administrative support for an additional 18 scientists from the Microgravity Vestibular Investigation and the Extended Duration Orbiter (EDO) international teams.

The DSLS sponsored over 45 meetings and seminars during 1993, including the Fourth Annual Investigators Meeting on Space Radiation Research and a series of EDO Medical Program Science Peer Review meetings held at the Center for Advanced Space Studies. A series of meetings to review the development of the new Gas Analyzer Mass Spectrometer to be used on Shuttle/MIR missions began in 1993 and will continue in 1994. The DSLS also hosted a number of seminars by scientists from the university medical community to facilitate scientific interchange with NASA.

The DSLS International Programs Office (IPO) acts as a liaison between the JSC Space and Life Sciences Directorate and the international community of aerospace and life sciences researchers. The IPO provides technical translation and interpretation services in support of Russian-American cooperation in joint space biomedical investigations and the MIR/Shuttle program. In 1993, the IPO provided support for more than 18 meetings and workshops held in the United States and Russia.



**Alfred C. Coats, M.D.**

Director

Alfred C. Coats holds full professorships in both the Department of Otorhinolaryngology and Communicative Sciences, and the Department of Neurology at Baylor College of Medicine in Houston, Texas. He is Director of the Cochlear and Vestibular Function Laboratories at Methodist Hospital and is on the clinical staff of the Methodist and Ben Taub Hospitals. Dr. Coats has authored or co-authored more than 60 papers in professional journals and has contributed to 15 books.



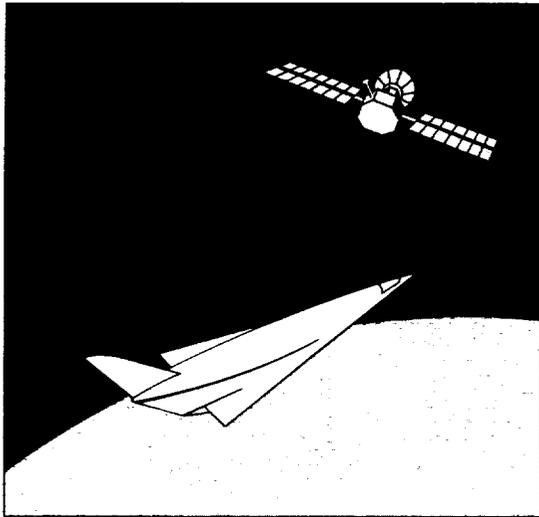
**Mr. John R. Sevier**

Deputy Director

USRA Division of Space Life Sciences  
Center for Advanced Space Studies  
3600 Bay Area Blvd.  
Houston, TX 77058-1113

(713) 244-2000 • FAX: (713) 244-2006

Internet: [dsls@cass.jsc.nasa.gov](mailto:dsls@cass.jsc.nasa.gov)



---

## DIVISION OF

---

## EDUCATIONAL

---

## PROGRAMS

---

---

---

---

---

---

---

---

---

---

The Division of Educational Programs (DEP), headquartered at the Center for Advanced Space Studies in Houston, supports the NASA/USRA University Advanced Design Program (ADP), and the Johnson Space Center (JSC) Summer Researchers Program. DEP personnel at the USRA Huntsville Office provide management services for the NASA/University Joint Venture (JOVE) Program.

### **NASA/USRA UNIVERSITY ADVANCED DESIGN PROGRAM**

The ADP brings together NASA engineers with university engineering students and faculty to carry out design projects on space and aeronautics topics, which, under ADP sponsorship, are incorporated into senior engineering design courses. In 1993, 44 universities, eight NASA centers, and one industry sponsor participated. The resulting design studies for future manned and unmanned endeavors in space and aeronautics were presented at the June 1993 ADP Conference. The conference was cohosted by NASA/JSC and had an attendance of 400.

### **JSC SUMMER RESEARCHERS PROGRAM**

The DEP and NASA/JSC are cooperating in a pilot program to bring teachers and students to JSC to contribute to ongoing research, and to revitalize their interest in space studies. The Summer Researchers

---

Program arose from the continuing commitment of NASA and USRA to strengthen academic partnerships and encourage educational leadership. During 1993, seven undergraduates, two graduate students, and two science teachers participated.

#### **NASA/UNIVERSITY JOINT VENTURE IN RESEARCH (JOVE)**

The JOVE program builds research capabilities and broadens academic participation in space science and technology through partnerships between NASA and institutions of higher education that have had little or no prior involvement in the nation's space program. JOVE also enhances university curricula via the integration of aerospace topics into the classroom and enhances public science literacy through outreach activities.

The JOVE program now involves 151 faculty members from 75 colleges throughout the United States and Puerto Rico. Eleven NASA centers, seven mentor universities, and one research institution sponsor JOVE faculty participants. JOVE is administered by the USRA Huntsville Office and is under the direction of Dr. Frank Six, University Affairs Officer at the NASA Marshall Space Flight Center.



**Mr. John R. Sevier**  
Director

John R. (Jack) Sevier is a graduate of MIT in aeronautical engineering. He held research posts at the NASA Langley Research Center, and later served in research and management at the NASA Johnson Space Center. Mr. Sevier joined USRA in 1977. He is also Deputy Director of the USRA Division of Space Life Sciences.



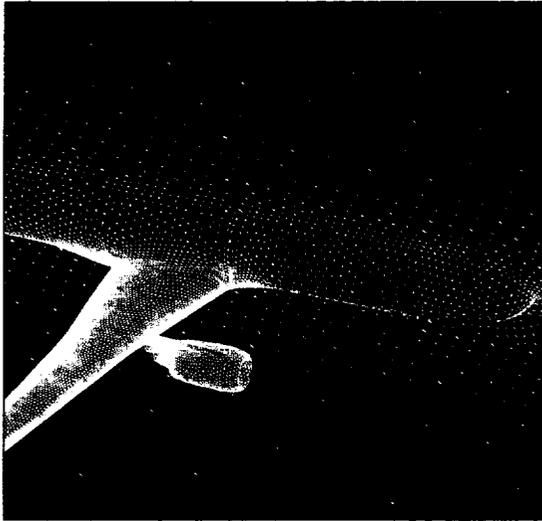
**Dr. Vicki S. Johnson**  
ADP Manager

USRA Division of Educational Programs  
Center for Advanced Space Studies  
3600 Bay Area Blvd.  
Houston, TX 77058-1113  
(713) 244-2000 • FAX: (713) 244-2006  
Internet: [dep@cass.jsc.nasa.gov](mailto:dep@cass.jsc.nasa.gov)



**Mr. Maurice G. Estes, Jr.**  
JOVE Manager

JOVE Program  
4950 Corporate Drive, Suite 100  
Huntsville, AL 35806  
(205) 895-0582 • FAX: (205) 895-9222  
Internet: [jove@space.hsv.usra.edu](mailto:jove@space.hsv.usra.edu)



---

INSTITUTE FOR

---

COMPUTER

---

APPLICATIONS IN

---

SCIENCE AND

---

ENGINEERING

---

---

---

---

---

The Institute for Computer Applications in Science and Engineering (ICASE), founded in 1972, is located at the NASA Langley Research Center (LaRC). ICASE provides a mechanism for interaction between LaRC scientists and the academic community, and serves as a focal point for activities related to applied mathematics, computer science, numerical analysis, and the application of mathematical, computational, and experimental techniques to the solution of scientific and engineering problems of interest to LaRC. ICASE conducts unclassified basic research in three major areas:

- Applied and numerical mathematics, including numerical analysis and algorithm development
- Theoretical, experimental, and computational research in science and engineering in selected areas, including fluid dynamics, acoustics, and combustion
- Computer science

The ICASE program is designed to promote research and build expertise in areas of relevance to LaRC. Research is conducted by staff scientists and by consultants and visiting scientists from universities and industry. Scientific visitors to ICASE receive resident appointments for limited time periods and contribute to the research program.

---

The research computing facilities of LaRC are available to ICASE. These include machines with advanced and novel architectures. In addition, ICASE operates its own SUN network and Silicon Graphics workstations.

Short courses and workshops cosponsored by ICASE and LaRC included a short course on wavelets, a short course on transition, a workshop on software techniques for performance and reliability estimation, and a short course on parallel computation. A major workshop was held in June on transition, turbulence and combustion.

In April, ICASE and LaRC presented the first biennial Theodorsen Lectureship Award to Sir James Lighthill of University College London for significant theoretical contributions to aeronautical sciences and engineering.

ICASE celebrated its twenty-year anniversary on May 25, 1993, with a program that included distinguished speakers from NASA and the university community.

The ICASE 1993 summer program attracted 96 scientists from around the world for intense study and interaction with colleagues at ICASE and LaRC. As of September 1993, ICASE was staffed by 23 scientific researchers, and augmented by seven visiting scientists, 51 consultants, and 13 graduate students.



**Dr. M.Y. Hussaini**

Director

M. Y. Hussaini received his doctorate in engineering from the University of California at Berkeley

in 1970. He obtained his basic degrees in mathematics and physics from the University of Madras, India. Prior to joining ICASE in 1978, Dr. Hussaini held positions at the Indian Space Research Organization and the NASA Ames Research Center. He was appointed ICASE Chief Scientist in 1986, and ICASE Director in April, 1992. His research interests presently include large-scale computations in fluid dynamics, parallel numerical solution of partial differential equations, mathematical combustion studies, and computational aeroacoustics.

ICASE

Mail Stop 132C

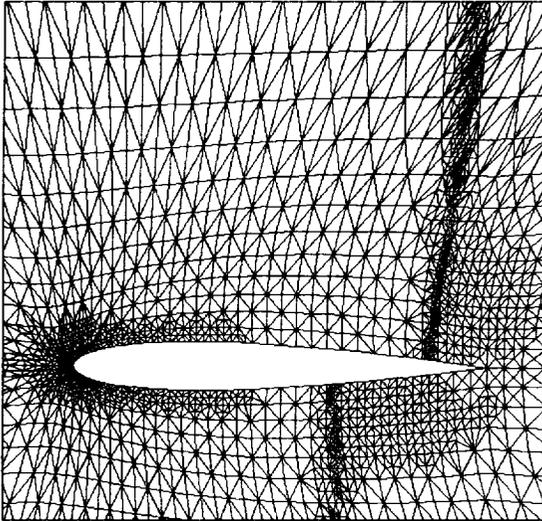
NASA Langley Research Center

Hampton, VA 23681-0001

(delivery: 18C West Taylor Street, Bldg. 1192C, Rm. 164)

(804) 864-2174 • FAX: (804) 864-6134

Internet: [info@icase.edu](mailto:info@icase.edu)



---

RESEARCH

---

INSTITUTE FOR

---

ADVANCED

---

COMPUTER

---

SCIENCE

---

---

---

---

---

---

The Research Institute for Advanced Computer Science (RIACS) was established by USRA at the NASA Ames Research Center in June, 1983. RIACS performs computer science research in collaboration with NASA scientists to solve challenging scientific problems in support of NASA's goals and missions. RIACS serves as an intermediary between the NASA Ames Research Center and the academic community. Research is carried out by a staff of full-time scientists, augmented by visitors, students, postdoctoral candidates, and visiting university faculty.

Principal areas of research include:

- Compilers for advanced computer architectures, such as massively parallel and distributed systems
- New algorithms for solving problems in science, especially on parallel computers
- Novel approaches for automated systems to perform pattern recognition and data classification
- Development and prototyping of technologies to support the use of multiple remote computing resources connected by networks

The largest single research area at RIACS is the study of the use of massively parallel computer systems. Such systems hold the promise of achieving the computational power needed to address the challenging scientific problems that arise in computational fluid dynamics. This emphasis within RIACS is a natural consequence of

---

the major role the NASA Ames Research Center plays in the analysis of advanced aerospace vehicle systems.

RIACS researchers have access to advanced computational resources such as a CM-5 Connection Machine, an Intel Paragon, Cray Y-MP and Cray-2 supercomputers, and advanced graphics superworkstations. The NSI network provides RIACS connection to the global Internet.

In 1993, RIACS had seven staff scientists, 13 visiting scientists, six postdoctoral scientists, nine consultants, one research associate, and five summer students.



**Dr. Joseph Oliger**

Director

Joseph Oliger received his Ph.D. in computer science from the University of Uppsala, Sweden in 1973. He

was named Director of RIACS in 1991. Dr. Oliger is also Professor of Computer Science at Stanford University, where he has been a faculty member since 1974. Dr. Oliger's research interests are in computational models of physical processes, numerical methods for partial differential equations, and computing hardware and languages for large-scale scientific computation.

RIACS

Mail Stop T20G-5

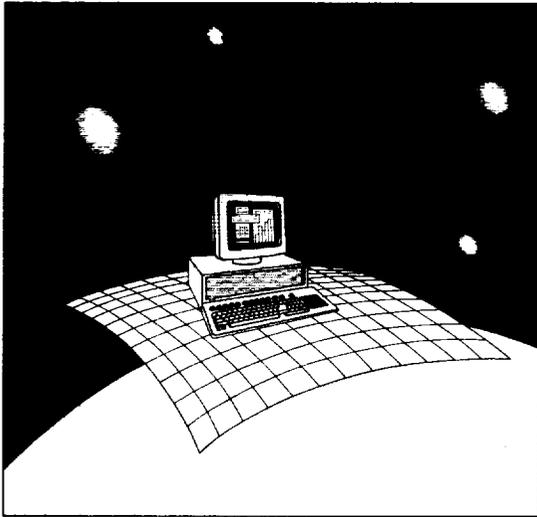
NASA Ames Research Center

Moffett Field, CA 94035-1000

(delivery: Bldg. T20G, Rm. 110)

(415) 604-5402 • FAX: (415) 962-7772

Internet: [postman@riacs.edu](mailto:postman@riacs.edu)



---

CENTER OF  
EXCELLENCE IN  
SPACE  
DATA AND  
INFORMATION  
SCIENCES

---

---

---

---

The Center of Excellence in Space Data and Information Sciences (CESDIS) began operations in the summer of 1988 at the NASA Goddard Space Flight Center in Greenbelt, Maryland. CESDIS research focuses on the design of advanced computing techniques and data systems to support NASA space and earth science research programs.

The primary CESDIS mission is to increase the connection between computer science and engineering research programs at colleges and universities and NASA groups working with computer applications in earth and space science. CESDIS research is primarily conducted through projects at colleges and universities in the United States, funded through multiyear CESDIS/NASA research awards. Research proposals are accepted in response to calls for proposals and are selected for funding on the basis of peer reviews. University research groups funded by CESDIS collaborate with appropriate research applications groups at various NASA centers. Project personnel also visit CESDIS periodically to attend workshops and present seminars.

Research areas of primary interest at CESDIS include:

- High performance computing, especially software design and performance evaluation for massively parallel machines

- 
- Parallel input/output and data storage systems for high performance parallel computers
  - Data base and data management systems for parallel computers
  - Image processing
  - Digital libraries
  - Data compression

CESDIS researchers have access to a wide range of high performance computer systems at Goddard, including a CRAY C98 supercomputer, a 16,000 processor MasPar MP-1, and advanced data storage systems. Massively parallel machines are available through the NASA High Performance Computing and Communications Program.

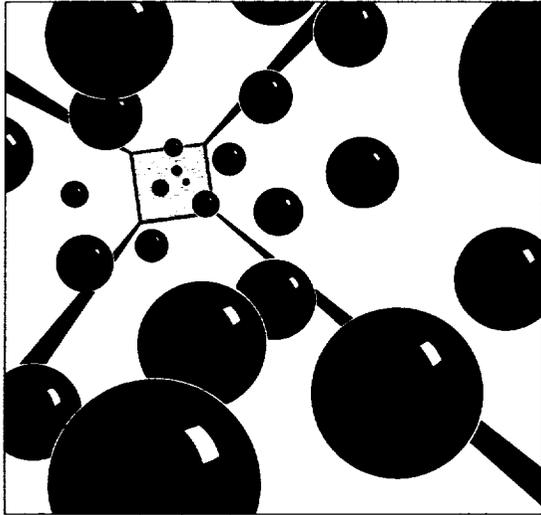
As a means of increasing communication and technology transfer between university researchers and NASA, CESDIS supports a technical report series, a regular seminar series, numerous individual seminars, and occasional workshops and conferences. The CESDIS office is located within the Goddard Space Data and Computing Division. The resident staff includes the acting director, three staff scientists, a senior administrator, and three administrative personnel. University researchers and graduate students are frequent visitors. CESDIS currently sponsors 28 university projects.



**Dr. Terrence W. Pratt**  
Acting Director

Terrence W. Pratt received his Ph.D. in mathematics, with a computer science emphasis, in 1965 from the University of Texas at Austin, and has served on the faculties of the University of Virginia, the University of Texas, and Michigan State University. He helped to found and served as the initial Director of the Institute for Parallel Computing at the University of Virginia. Dr. Pratt joined CESDIS in 1992 as Associate Director, and became Acting Director in October, 1993. His research interests are: parallel programming languages, parallel input-output systems, and performance measurement of high-performance computers.

CESDIS  
Code 930.5  
NASA Goddard Space Flight Center  
Greenbelt, MD 20771  
(delivery: Nimbus Road, Bldg. 28, Rm. W223)  
(301) 286-4403 • FAX: (301) 286-1777  
Internet: [cas@cesdis1.gsfc.nasa.gov](mailto:cas@cesdis1.gsfc.nasa.gov)



---

DIVISION OF

---

MICROGRAVITY

---

SCIENCE AND

---

APPLICATIONS

---

---

---

---

---

---

---

The USRA Division of Microgravity Science and Applications manages the Visiting Scientist Program in microgravity sciences at the NASA Marshall Space Flight Center (MSFC) in Huntsville, Alabama. The USRA Microgravity Program, ongoing for over twenty years, provides the Microgravity Science and Applications Division of MSFC with qualified visiting scientists, scientific and technical consultants, and collaborating university faculty members. The Program also assists in organizing and providing administrative services for scientific workshops and related activities. USRA visiting scientists have contributed significantly to the NASA research effort with more than 200 scientific reports and publications and over 80 presentations at meetings and conferences.

A collaborative arrangement with the Alabama Space Grant Consortium enhances the Visiting Scientist Program by promoting academic interchange between visiting scientists and Consortium member institutions. Such interchange includes adjunct appointments in appropriate cases, and availability of laboratories and other facilities.

The Program is staffed by the Huntsville program director, four full-time senior scientists, and the full-time equivalent of eight visiting scientists. Participants also include consultants and student visitors.

---

Current research areas include biophysics, electronic and photonic materials, chemistry, and polymeric materials. Research projects are listed below.

#### Biophysics

- Structure of biomedically important proteins
- Thermodynamic properties of various proteins
- Models of protein nucleation
- Experimental techniques for the growth of protein crystals
- Physics of electrical double layers in the mechanics of liquid interfaces
- Biochemical separation processes
- Numerical modeling of processes including bioconvection, solidification phenomena, and electrohydrodynamics

#### Electronic and Photonic Materials

- Crystal growth and characterization of Type II-VI semiconducting materials
- Alloy solidification and containerless processing of materials

#### Chemistry, Polymeric Materials

- Production of thin films for nonlinear optics
- Modeling biphasic system demixing and solidification



**Dr. Martin E. Glicksman**  
Director

Martin E. Glicksman is John Tod Horton Distinguished Professor of Materials and Chemical Engineering at Rensselaer Polytechnic Institute, where he received his Ph.D. in physical metallurgy in 1961. He has led the USRA Microgravity Program since 1986, and was appointed director of the newly-formed USRA Division of Microgravity Science and Applications in 1991. Dr. Glicksman's research interests include the study of solidification phenomena in metals and alloys, and elucidation of microstructural scaling laws.



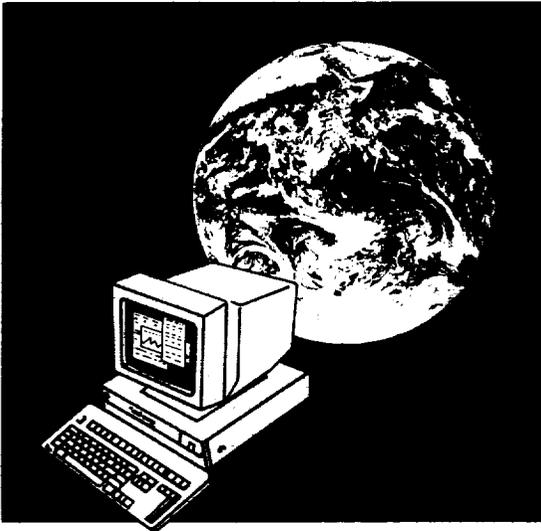
**Dr. James M. Van Alstine**  
Huntsville Program Director

James M. Van Alstine is Associate Professor of Chemistry and Materials Science at the University of Alabama in Huntsville. His Ph.D. is from the University of British Columbia. His current research interests involve bioseparations and biocompatibility.

USRA Division of Microgravity Science and Applications  
4950 Corporate Drive, Suite 100  
Huntsville, AL 35806

(205) 895-0582 • FAX: (205) 895-9222

Internet: [micro@space.hsv.usra.edu](mailto:micro@space.hsv.usra.edu)



---

INSTITUTE FOR

---

GLOBAL

---

CHANGE

---

RESEARCH AND

---

EDUCATION

---

---

---

---

---

---

The Universities Space Research Association (USRA) has joined with the University of Alabama in Huntsville (UAH) to operate the newly formed Institute for Global Change Research and Education (IGCRE). Research within the Institute is aimed at advancing understanding of the roles of water and energy in the dynamics of global change. In addition to research, IGCRE is integrating its programs with the educational needs of global change science curricula at the college and the pre-college levels to communicate the importance and challenges of global change science.

IGCRE research scientists at the NASA Marshall Space Flight Center (MSFC) collaborate with NASA scientists pursuing ongoing research topics in global change. Current IGCRE research topics fall within the following categories:

- Geophysical modeling and process investigations
- Land-surface processes and atmospheric interaction studies
- Remote sensing and geophysical retrieval methods
- Data management and analysis research

In addition to sponsoring resident scientists, IGCRE sponsors visits by university faculty members and graduate students, workshops, sabbatical and summer visits, graduate-student assistantships, and seminars.

---

IGCRE programs seek to draw on the broad national and international science community engaged in global change research.

Currently, the Institute employs 14 research scientists sponsored by USRA, and 12 full-time researchers sponsored by UAH. In addition, USRA sponsors several university visitors and consultants while UAH sponsors several faculty members and graduate students. The resources provided by UAH and USRA provide a synergistic approach to address the complex scientific problems and educational challenges associated with global change science.



**Dr. Donald J. Perkey**

Interim Director

Donald J. Perkey holds a doctorate in meteorology from The Pennsylvania State University. After receiving his degree, he went to work at NCAR as a member for the GATE group and then later as a member of the Mesoscale Research Section. Dr. Perkey subsequently joined the Department of Physics and Atmospheric Science at Drexel University where he is currently a professor. Dr. Perkey has been Principal Investigator on research projects for NOAA-ERL, NASA, NSF and the Navy. In 1993, Dr. Perkey joined the faculty of the University of Alabama in Huntsville as Visiting Professor, and was appointed Interim Director of IGCRE.

**Mr. Maurice G. Estes, Jr.**

Assistant Director for Administration

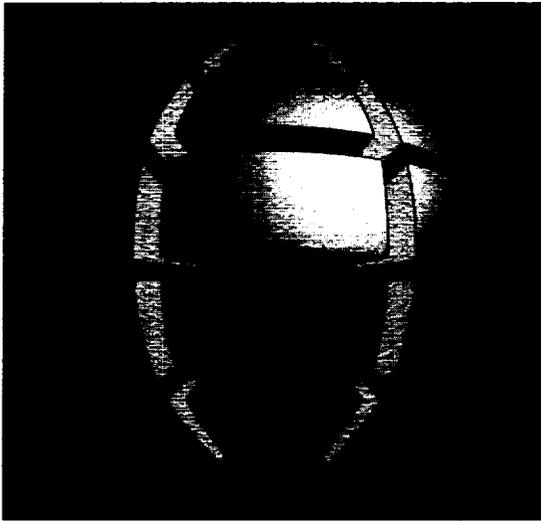
IGCRE

4950 Corporate Drive, Suite 200

Huntsville, AL 35806

(205) 895-0662 • FAX: (205) 895-9222

Internet: [igcre@space.hsv.usra.edu](mailto:igcre@space.hsv.usra.edu)



---

# EARTH

---

# SCIENCES

---

# PROGRAMS

---

---

---

---

---

---

---

## UNIVERSITY-BASED COOPERATIVE PROGRAM IN EARTH SYSTEM SCIENCE EDUCATION

The NASA University-Based Cooperative Program in Earth System Science Education (ESSE) is currently administered through USRA's Huntsville Office. ESSE supports development of undergraduate curricula emphasizing a multidisciplinary approach to the study of the planet Earth as a unified physical system. Nationwide, 22 universities take part in the program. Each offers an introductory survey course, together with a senior course.

Emphasis in senior ESSE courses is on project-oriented team problem solving. A key ingredient is the involvement of faculty members and students from different departments in earth and physical sciences who work together on projects that involve development of models of earth system processes and dynamics. Each ESSE institution is associated with a NASA affiliate scientist who assists in relating the senior course curriculum to NASA missions and facilitates access to NASA data and other resources.

### USRA-ESSE

4950 Corporate Drive, Suite 100  
Huntsville, AL 35806

(205) 895-0582 • FAX: (205) 895-9222

Internet: [maury@space.hsv.usra.edu](mailto:maury@space.hsv.usra.edu)

---

## UNIVERSITIES EARTH SCIENCES PROGRAM

Under the NASA-sponsored Universities Earth Sciences Program (UESP), USRA brings qualified junior and senior university scientists from the various earth science disciplines to work for a one- to two-year period with scientists at NASA Headquarters. The program goals are: (1) to bring to the Office of Mission to Planet Earth outside fundamental scientific and technical expertise covering the earth science disciplines; (2) to conduct basic research in order to establish the state of the science and technological readiness related to global change, clouds and radiative balance, solid earth, oceans, polar ice sheets, land-surface hydrology, ecological dynamics, biological diversity, and sustainable development; (3) to assist in the definition of new research thrusts for missions; and (4) to participate in the formulation of alternative strategies that can serve as a basis for national and international policy on issues related to earth science. Appointees maintain their affiliation with home institutions and are encouraged to return periodically during their tenure. Program offices are in the USRA Washington Office.

### USRA-UESP

300 D Street, SW, Suite 801  
Washington, DC 20024

(202) 479-2609 • FAX: (202) 479-2613

Internet: [lpenteco@usra.edu](mailto:lpenteco@usra.edu)



**Dr. Donald R. Johnson**

Director, ESSE

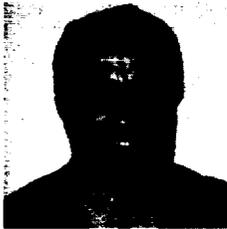
Donald R. Johnson's Ph.D. is in Meteorology from the University of Wisconsin-Madison, where he is Professor of Atmospheric and Oceanic Sciences and Associate Director of the Space Science and Engineering Center. He was President of the American Meteorological Society in 1992, and is a USRA Trustee.



**Dr. Michael Kalb**

Associate Director, ESSE

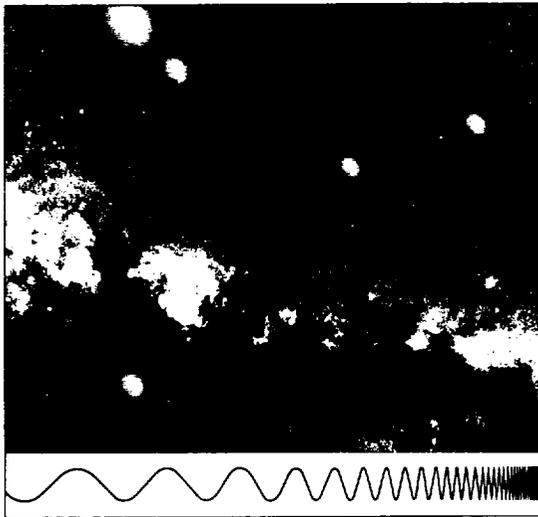
Dr. Kalb is also Director of the USRA Visiting Scientist Program at Goddard.



**Dr. John E. Estes**

Director, UESP

John E. (Jack) Estes received his Ph.D. in Geography from the University of California, Los Angeles in 1969. He is on leave from his position as Professor of Geography at the University of California, Santa Barbara. Professor Estes is an authority on the analysis of satellite data and on the use of geographic information systems for earth science research.



---

## DIVISION OF

---

## ASTRONOMY AND

---

## SPACE PHYSICS

---

---

---

---

---

---

---

---

---

USRA's Division of Astronomy and Space Physics supports scientists at NASA's Goddard Space Flight Center and Marshall Space Flight Center, and at the Naval Research Laboratory and the U.S. Naval Observatory. The division director maintains offices at the University of Maryland, and near the Goddard Space Flight Center.

### **SUPPORT FOR THE GODDARD HIGH-ENERGY ASTROPHYSICS RESEARCH PROGRAM**

USRA's Program in support of the NASA Goddard Space Flight Center's Laboratory for High-Energy Astrophysics (LHEA) was established in 1993 with two primary goals. The first is to attract and retain high caliber research scientists to support the long-term research, guest observer, data archive, and instrument development projects within the Laboratory. The second goal is to foster collaboration between the Goddard Laboratory and the larger high-energy astrophysics research community. To fulfill these goals, USRA recruits and supports a staff of scientific researchers, operates a series of guest investigator facilities, organizes scientific meetings and workshops, and encourages various interactions with students and university faculty members.

USRA scientists are integral participants in all four of LHEA's major functional activities:

- Observation, experimentation, and data analysis
- Instrument development
- Theoretical research
- Community science support

---

USRA scientists work on a blend of programmatic responsibilities and personal research that is related to the research interests of the groups in which they work. The USRA staff contributes to the LHEA observing and experimental programs, both space-flight projects, such as the Broad Band X-Ray Telescope, and balloon-borne instruments, such as "ALICE" (A Large Isotopic Composition Experiment). USRA scientists are working on instrument development projects which include the Advanced Gamma-Ray Astronomy Telescope (AGATE) and the Proportional Counter Array for the XTE. USRA also provides support to the LHEA theoretical program. Community science support is grouped under LHEA's Office of Guest Investigator Programs (OGIP). OGIP provides a high quality standard of assistance to guest investigators interested in scientific research on the High-Energy Astrophysics archival data available at Goddard Space Flight Center. Programs in which USRA scientists play key roles include the High-Energy Astrophysics Science Archive Research Center (HEASARC), the Compton Gamma-Ray Observatory Science Support Center (GROSSC), the guest observer facilities for the Roentgen Satellite (ROSAT), the Advanced Satellite for Cosmology and Astrophysics (ASCA), and the X-Ray Timing Explorer (XTE).

Conferences in 1993-1994 include a ROSAT Symposium and Data Analysis Workshop, and a workshop on numerical simulations of particle acceleration. The USRA program currently supports 36 scientists.



**Dr. Frank J. Kerr**  
Division Director

Frank J. Kerr's D.Sc. degree is from the University of Melbourne. He joined the faculty of the University of Maryland in 1966 and was Provost of the Division of Mathematical and Physical Sciences and Engineering from 1978 to 1985. Dr. Kerr is an internationally known radio astronomer.



**Mr. David V. Holdridge**  
Project Manager

USRA High-Energy Astrophysics Program Support Office

**On-Site**

Mail Code 610.3  
NASA Goddard Space Flight Center  
Greenbelt, MD 20771  
(301) 286-5057

**Off-Site**

7501 Forbes Blvd., Suite 206  
Seabrook, MD 20706-2253  
(301) 805-8396 • FAX: (301) 805-8466  
Internet: [gvsp@gvsp.usra.edu](mailto:gvsp@gvsp.usra.edu)

---

**THE NAVAL RESEARCH LABORATORY AND THE  
U.S. NAVAL OBSERVATORY PROGRAMS**

USRA-sponsored research at NRL is conducted within the NRL Space Science Division. Scientists work on a variety of projects in the Gamma- and Cosmic-Ray Astrophysics Branch, such as the Oriented Scintillation Spectrometer Experiment (OSSE) on board the Compton Gamma-Ray Observatory. Detectors for use in gamma-ray astronomy are also being developed along with new classes of X-ray detectors using superconducting materials. USRA research at the U.S. Naval Observatory in Washington, D.C. centers around the optical interferometer project. Scientists at USNO-Flagstaff are conducting research on the design, development, and analysis of charge-coupled detectors for use in precision astronomy. Currently, 16 scientists and two science consultants participate in the program.

**THE MARSHALL SPACE FLIGHT CENTER PROGRAM**

The USRA program at NASA's Marshall Space Flight Center supports 12 scientists and data base managers in conjunction with the MSFC Astrophysics Division. USRA conducted over 20 seminars and colloquia and sponsored 12 consultants during 1993. Research includes support for the Burst and Transient Source Experiment (BATSE) carried by the Compton Gamma-Ray Observatory, and studies on cosmic ray trapped belt radiation, and solar energetic particles.



**Ms. Elizabeth Pentecost**

Deputy Director for the USRA  
Astronomy and Astrophysics  
Programs at NRL and USNO

USRA Astronomy Program  
300 D Street, SW, Suite 801  
Washington, DC 20024

(202) 479-2609 • FAX: (202) 479-2613

Internet: [lpenteco@usra.edu](mailto:lpenteco@usra.edu)

---



**Ms. Paula Cushman**

Manager for the USRA Astronomy  
and Astrophysics Program at MSFC



**Dr. Chryssa Kouveliotou**

On-Site Coordinator at MSFC

USRA Astronomy Program  
4950 Corporate Drive, Suite 100  
Huntsville, AL 35806

(205) 895-0582 • FAX: (205) 895-9222

Internet: [paula@space.hsv.usra.edu](mailto:paula@space.hsv.usra.edu)

---

## UNIVERSITY VISITING SCIENTISTS IN SPACE PHYSICS

Under the new NASA-sponsored University Visiting Scientists in Space Physics program, USRA brings qualified senior university scientists from the space physics disciplines to work for periods of one to two years with scientists in the Space Physics Division at NASA Headquarters. Their assignment is to help establish scientific priorities for investigations dealing with the upper atmospheres, ionospheres, and magnetospheres of the Earth and other planets; the Sun as a star; and the acceleration, transport, and interactions of energetic particles and plasmas throughout the solar system and the galaxy. Appointees assist NASA in the definition of new science missions, make recommendations, and suggest policy alternatives.

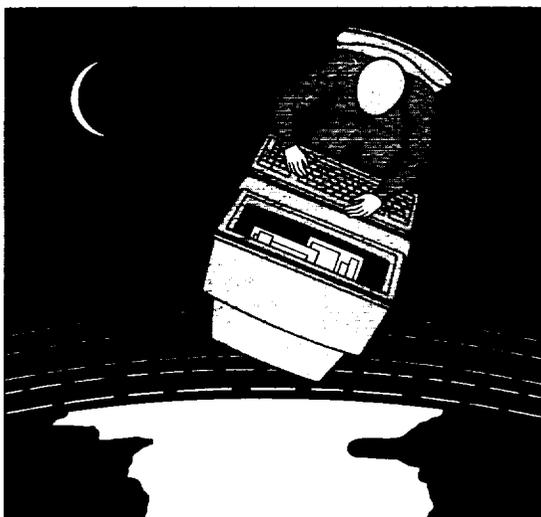


**Dr. James Willett**  
Program Director

Dr. James Willett, a physicist at the California Institute of Technology's Jet Propulsion Laboratory for 23 years, has served the last three years at NASA Headquarters as the Mission Operations and Data Analysis Coordinator for the Space Physics Division. Prior to the NASA Headquarters assignment he was Chief of the Fields and Particles Science Team for the Galileo mission to Jupiter. Dr. Willett received his Ph.D. in nuclear physics from Indiana University in 1969, and while at JPL carried out research in nuclear astrophysics, planetary exploration, and international standards.

USRA Space Physics Program  
300 D Street, SW, Suite 801  
Washington, DC 20024

(202) 479-2609 • FAX: (202) 479-2613  
Internet: [lpenteco@usra.edu](mailto:lpenteco@usra.edu)



---

# VISITING SCIENTIST

---

# PROGRAM AT THE

---

# NASA GODDARD

---

# SPACE FLIGHT

---

# CENTER

---

---

---

---

---

---

The USRA Visiting Scientist Program at the NASA Goddard Space Flight Center (GSFC) began in October 1988 as a five-year program. NASA support was renewed for another five years in October 1993. Under program sponsorship, scientists are brought to GSFC for limited periods of up to two years to collaborate with NASA colleagues on research projects in the Goddard Laboratories for High-Energy Astrophysics, Astronomy and Solar Physics, Extraterrestrial Physics, Atmospheres, Terrestrial Physics, Space Data and Computing, and Hydrospheric Processes. To promote Goddard-university connections, USRA visiting scientists are encouraged to establish formal ties with university departments, and university faculty members are encouraged to visit the Goddard Center while on sabbatical leave and to submit joint research proposals with Goddard scientists.

Besides recruitment and support of visiting research scientists, USRA frequently arranges for short-term senior visitors to the Goddard Center to act as colloquium speakers and project consultants. The USRA Program also manages scientific meetings and prepares reports and proceedings.

As of October 1993, the USRA Goddard Visiting Scientist Program employed approximately 60 full-time research scientists in space and earth sciences. The Program also

---

sponsored approximately 185 short-term visitors to GSFC during the last year. Nearly 600 short-term visitors have been sponsored since the Program's inception.

The program office also actively supports educational and research opportunities for students. A major focus is sponsorship of the Graduate Student Summer Program in Earth System Sciences in which selected students are teamed with Goddard scientific mentors for a ten-week summer research project. This student program also includes an intensive public lecture series that focuses on scientific issues relating to NASA's Mission to Planet Earth.

USRA manages other summer programs for students at GSFC, including the Visiting Student Enrichment Program in the physical sciences, mathematics, and computer sciences, which involves high-school through graduate-level students; and the Summer School for High Performance Computational Sciences for graduate students. In all, 53 students visited GSFC during the summer of 1993. All together, 214 students have participated in USRA-sponsored student programs at Goddard during the past five years.



**Dr. Michael Kalb**

Director

Michael Kalb received his doctorate in meteorology from the University of Wisconsin-Madison in 1983. He

joined USRA in 1983 as a visiting scientist in the Atmospheric Sciences Program at MSFC, and became director of that program in 1987. His research interests focus on remote sensing and numerical atmospheric modeling. He is also Associate Director of the Earth System Science Education Program (ESSE).



**Dr. Sethanne Howard**

Deputy Director

Dr. Howard is an astrophysicist.

**On-Site**

Mail Code 610.3

NASA Goddard Space Flight Center  
Greenbelt, MD 20771

(301) 286-5057

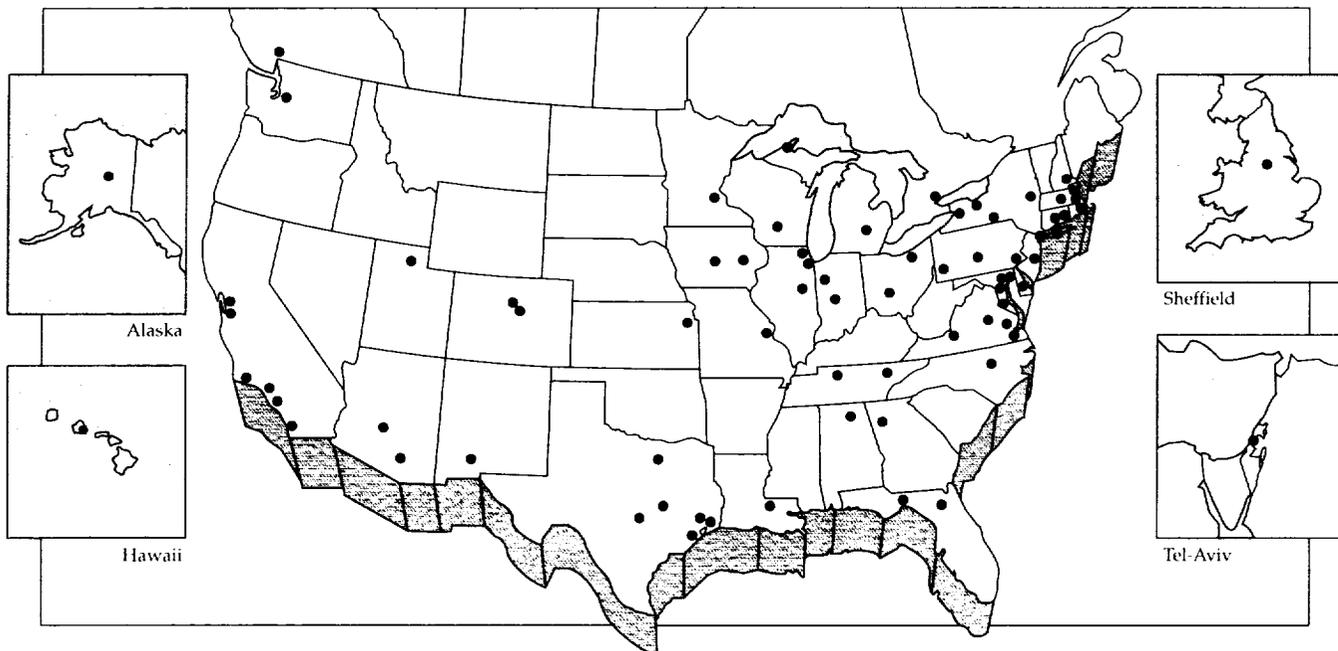
**Off-Site**

7501 Forbes Blvd., Suite 206  
Seabrook, MD 20706-2253

(301) 805-8396 • FAX: (301) 805-8466

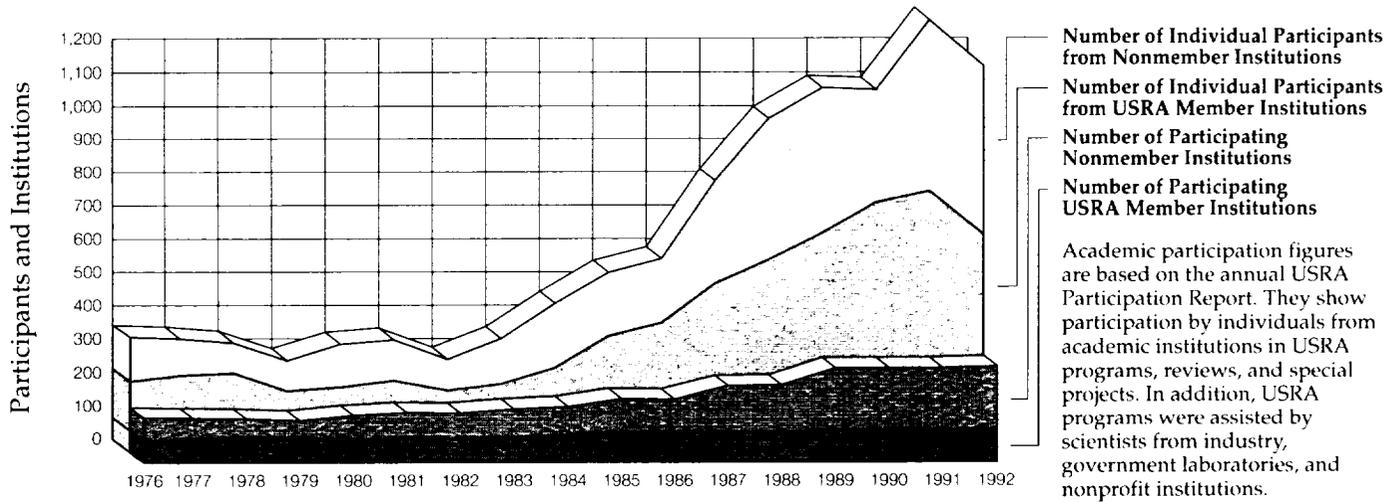
Internet: [gvsp@gvsp.usra.edu](mailto:gvsp@gvsp.usra.edu)

# MEMBER INSTITUTIONS

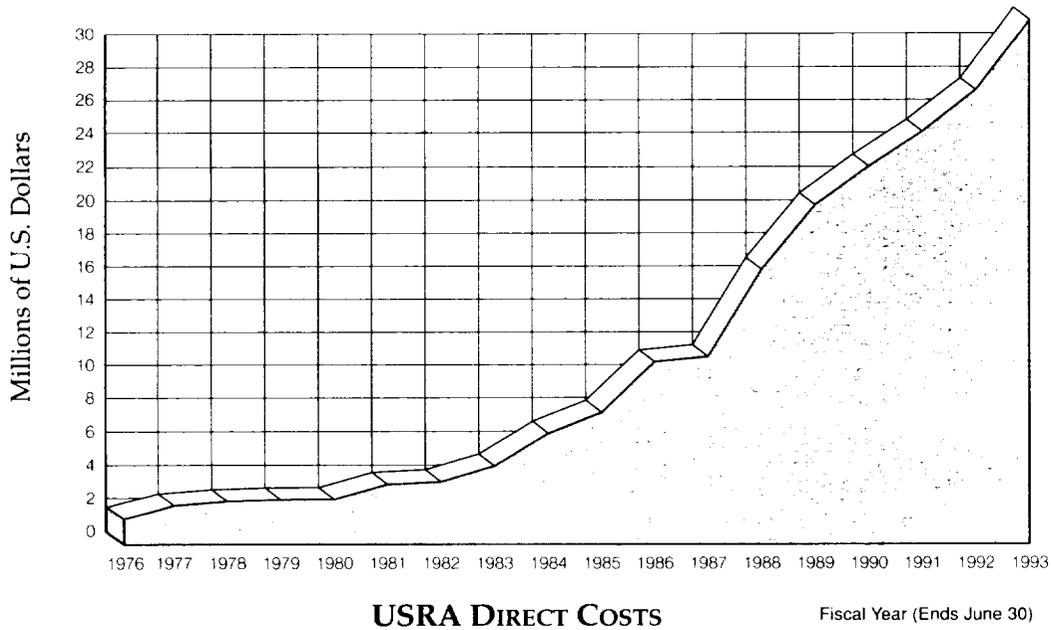


- Alabama, University of, Huntsville
- Alaska, University of, Fairbanks
- Arizona, University of
- Arizona State University
- Boston College
- Brandeis University
- British Columbia, University of
- Brown University
- California, University of, Berkeley
- California, University of, Los Angeles
- California, University of, San Diego
- California, University of, Santa Barbara
- Case Western Reserve University
- Chicago, University of
- Colorado, University of, Boulder
- Connecticut, University of
- Cornell University
- Delaware, University of
- Denver, University of
- Florida, University of
- Florida State University
- George Washington University
- Georgetown University
- Georgia Institute of Technology
- Harvard University
- Hawaii, University of, Manoa
- Houston, University of
- Illinois, University of, Urbana-Champaign
- Indiana University
- Iowa, University of
- Iowa State University
- Johns Hopkins University
- Kansas, University of
- Lehigh University
- Louisiana State University
- Maryland, University of, College Park
- Massachusetts Institute of Technology
- Michigan, University of
- Michigan Technological University
- Minnesota, University of
- New Hampshire, University of
- New Mexico State University
- New York, State University of, Buffalo
- New York, State University of, Stony Brook
- New York University
- North Carolina State University
- Northwestern University
- Ohio State University
- Old Dominion University
- Pennsylvania State University
- Pittsburgh, University of
- Princeton University
- Purdue University
- Rensselaer Polytechnic Institute
- Rice University
- Rochester, University of
- Rockefeller University
- Sheffield, University of
- Southern California, University of
- Stanford University
- Tel-Aviv University
- Tennessee, University of
- Texas, University of, Austin
- Texas, University of, Dallas
- Texas, University of, Medical Branch, Galveston
- Texas A & M University
- Toronto, University of
- Utah State University
- Vanderbilt University
- Virginia, University of
- Virginia Polytechnic Institute and State University
- Washington, University of
- Washington University in St. Louis
- William and Mary, College of
- Wisconsin, University of, Madison
- Yale University

# USRA GROWTH RECORD



## ACADEMIC PARTICIPATION IN USRA PROGRAMS



# BOARD OF TRUSTEES



**Bobby R. Alford, M.D.**  
Baylor College of  
Medicine



**Dr. Roger L. Arnoldy**  
University of  
New Hampshire



**Dr. Mary Bisson**  
State University of  
New York at Buffalo



**Dr. Andrew J. Callegari**  
Exxon Research and  
Engineering



**Dr. Robert Cassanova**  
Georgia Institute of  
Technology  
*Chair, Board of Trustees*



**Dr. Paul J. Coleman, Jr.**  
*ex officio,*  
*USRA President*



**Dr. Joe G. Easley**  
University of Michigan



**Dr. Paul D. Feldman**  
The Johns Hopkins  
University



**Dr. Laurence Fredrick**  
University of Virginia  
*ex officio,*  
*Chair, Council of Institutions*



**Dr. Catherine Gautier**  
University of California,  
Santa Barbara



**Mr. Robert W. Hager**  
Retired from Boeing  
Missiles and Space Division



**Dr. John H. Hoffman**  
University of Texas  
at Dallas



**Dr. Donald R. Johnson**  
University of  
Wisconsin-Madison



**Dr. Eugene H. Levy**  
University of Arizona

*January, 1994*

# COUNCIL OF INSTITUTIONS

---

University of Alabama in Huntsville Dr. Charles Lundquist	University of Florida Dr. Thomas E. Walsh	Michigan Technological University Dr. Bruce Pletka	University of Southern California Prof. Darrell L. Judge
University of Alaska Fairbanks Dr. Neal Brown	Florida State University Dr. James J. O'Brien	University of Minnesota Dr. Paul Weiblen	Stanford University Dr. Peter Michelson
Arizona State University Dr. John W. Larimer	The George Washington University Dr. Burton I. Edelson	University of New Hampshire Dr. Roger L. Arnoldy	Tel-Aviv University Dr. Saul Abarbanel
University of Arizona Dr. Eugene H. Levy	Georgetown University Dr. William Thaler	New Mexico State University Dr. Averett Tombes	University of Tennessee Dr. Joel W. Muehlhauser
Boston College Dr. Robert Carovillano	Georgia Institute of Technology Dr. Robert Cassanova	State University of New York at Buffalo Dr. John King	Texas A & M University Dr. Walter E. Haisler
Brandeis University Dr. James Lackner	Harvard University Dr. A. G. W. Cameron	State University of New York at Stony Brook Dr. Jack Lissauer	The University of Texas at Austin Dr. Byron D. Tapley
University of British Columbia Dr. Donald Brooks	University of Hawaii at Manoa Dr. B. Ray Hawke	New York University Dr. Eugene Isaacson	The University of Texas at Dallas Dr. John H. Hoffman
Brown University Dr. Carlé Pieters	University of Houston Dr. Elbert King	North Carolina State University Dr. Gordon Lee	The University of Texas Medical Branch at Galveston Dr. Louis C. Sheppard
University of California, Berkeley Prof. Alberto Grünbaum	University of Illinois at Urbana-Champaign Dr. Kenneth R. Sivier	Northwestern University Dr. Melville Ulmer	University of Toronto Dr. R. C. Tennyson
University of California, Los Angeles Dr. Paul J. Coleman, Jr.	Indiana University Dr. Jeremy D. Dunning	Ohio State University Dr. Thomas York	Utah State University Dr. Robert Schunk
University of California, San Diego Dr. James Arnold	Iowa State University Dr. Wallace W. Sanders, Jr.	Old Dominion University Dr. Surendra N. Tiwari	Vanderbilt University Dean Edward Parrish
University of California, Santa Barbara Dr. Raymond Smith Dr. Catherine Gautier	University of Iowa Prof. Gerald L. Payne	The Pennsylvania State University Dr. Leslie Hale	Virginia Polytechnic Institute and State University Dr. E. R. Stout
Case Western Reserve University Dr. Simon Ostrach	The Johns Hopkins University Dr. Paul D. Feldman	University of Pittsburgh Dr. William Cassidy	University of Virginia Dr. Laurence Fredrick <i>Council Chair</i>
University of Chicago Dr. Dietrich Muller	The University of Kansas Dr. Thomas P. Armstrong	Princeton University Dr. Seymour M. Bogdonoff	University of Washington Dr. John B. Adams
University of Colorado at Boulder Dr. David R. Kasso	Lehigh University Dr. Joseph Goldstein	Purdue University Prof. James M. Longuski	Washington University in St. Louis Prof. W. Robert Binns
University of Connecticut Dr. Harold D. Brody	Louisiana State University Dr. John P. Wefel	Rensselaer Polytechnic Institute Dr. Lester A. Gerhardt	College of William and Mary Dr. William Bynum
Cornell University Dr. Joseph Veverka	University of Maryland at College Park Dr. George Gloeckler	Rice University Dr. Patricia Reiff	University of Wisconsin-Madison Dr. Donald R. Johnson
University of Delaware Dr. Norman F. Ness	Massachusetts Institute of Technology Dr. Gordon Pettengill	University of Rochester Dr. John Thomas	Yale University Dr. Sabatino Sofia
University of Denver Dr. David Guy Murcray	University of Michigan Dean George Carignan	The Rockefeller University Dr. Konstantin Goulianos	
		University of Sheffield Dr. Timothy E. Treffry	<i>January, 1994</i>

# SCIENCE COUNCILS

---

## LUNAR AND PLANETARY SCIENCE COUNCIL

Prof. Michael J. Drake  
*(convener)*  
University of Arizona

Dr. Reta Beebe  
New Mexico State University

Dr. David C. Black  
*(ex officio)*  
USRA-LPI

Dr. Peter Bodenheimer  
University of California,  
Santa Cruz

Dr. Robert A. Brown  
Space Telescope Science  
Institute

Dr. Grant H. Heiken  
Los Alamos National  
Laboratory

Dr. Janet Luhmann  
University of California,  
Los Angeles

Dr. Ronald Saunders  
Jet Propulsion Laboratory

Dr. Sean C. Solomon  
Carnegie Institute  
of Washington

## SCIENCE COUNCIL FOR THE INSTITUTE OF COMPUTER APPLICATIONS IN SCIENCE AND ENGINEERING (ICASE)

Dr. James M. Kendall  
*(convener)*  
Jet Propulsion Laboratory

Dr. Ivo Babuska  
University of Maryland

Dr. Geoffrey Fox  
Syracuse University

Dr. M.Y. Hussaini *(ex officio)*  
USRA-ICASE

Dr. Ashwani Kapila  
Rensselaer Polytechnic  
Institute

Dr. Heinz-Otto Kreiss  
University of California,  
Los Angeles

Dr. Sanjoy Mitter  
Massachusetts Institute  
of Technology

Dr. Steven Orszag  
Princeton University

Dr. Eli Reshotko  
Case Western Reserve  
University

Dr. Ahmed Sameh  
University of Minnesota

## SCIENCE COUNCIL FOR THE RESEARCH INSTITUTE FOR ADVANCED COMPUTER SCIENCE (RIACS)

Dr. Dennis B. Gannon  
*(convener)*  
Indiana University

Dr. James W. Demmel  
University of California  
at Berkeley

Dr. Joseph Flaherty  
Rensselaer Polytechnic  
Institute

Dr. David Gottlieb  
Brown University

Dr. Joseph Oliger *(ex officio)*  
USRA-RIACS

Dr. Kenneth W. Neves  
Boeing Company, Seattle

Dr. Thomas H. Pulliam  
NASA / Ames Research Center

Dr. Daniel A. Reed  
University of Illinois at  
Urbana-Champaign

Dr. Robert B. Schnabel  
University of Colorado at  
Boulder

Dr. Marc Snir  
IBM Thomas J. Watson  
Research Center

## SCIENCE COUNCIL FOR THE CENTER OF EXCELLENCE IN SPACE DATA AND INFORMATION SCIENCES (CESDIS)

Dr. Lawrence Snyder  
*(convener)*  
University of Washington

Dr. David DeWitt  
University of Wisconsin  
at Madison

Dr. S. Lennart Johnsson  
Thinking Machines Corp.

Dr. Michael O'Donnell  
University of Chicago

Dr. Terrence W. Pratt  
*(ex officio)*  
USRA-CESDIS

Dr. Theodosios Pavlidis  
State University of New York  
at Stony Brook

Dr. Patricia Selinger  
IBM Almaden Research  
Center

Dr. Harold S. Stone  
IBM Thomas J. Watson  
Research Center

Dr. Michael R. Stonebraker  
University of California  
at Berkeley

Dr. Satish K. Tripathi  
University of Maryland

**DIVISION OF SPACE  
LIFE SCIENCES  
SCIENCE COUNCIL**

Bobby R. Alford, M.D.  
*(convener)*  
Baylor College of Medicine

F. Owen Black, M.D.  
Good Samaritan Hospital  
Portland, Oregon

Albert C. Coats, M.D.  
*(ex officio)*  
USRA-DLSL and Baylor  
College of Medicine

Michael Holick, M.D.  
Boston University Medical  
School

Thomas James, M.D.  
University of Texas,  
Medical Branch  
at Galveston

Dr. James Lackner  
Brandeis University

M. David Low, M.D., Ph.D.  
University of Texas,  
Health Science Center,  
Houston

Dr. Charles Oman  
Massachusetts Institute  
of Technology

Dr. Harrison Schmitt  
Albuquerque, New Mexico

Scott Swisher, M.D.  
Michigan State University,  
emeritus

**MICROGRAVITY  
SCIENCE AND  
APPLICATIONS  
SCIENCE COUNCIL**

Dr. Simon Ostrach  
*(convener)*  
Case Western Reserve  
University

Dr. J. Barry Andrews  
University of Alabama,  
Birmingham

Dr. Martin E. Glicksman  
*(ex officio)*  
Rensselaer Polytechnic  
Institute

Dr. David Larson  
Grumman Corporation

Dr. Alexander McPherson  
University of California,  
Riverside

Dr. Franz E. Rosenberger  
University of Alabama  
in Huntsville

Dr. Albert Sacco, Jr.  
Worcester Polytechnic  
Institute

Dr. Eugene H. Trinh  
Jet Propulsion Laboratory

Dr. Raymond Viskanta  
Purdue University

Dr. Forman A. Williams  
University of California,  
San Diego

**ASTRONOMY AND  
SPACE PHYSICS  
SCIENCE COUNCIL**

Dr. Giovanni G. Fazio  
*(convener)*  
Smithsonian Astrophysical  
Observatory

Dr. Ferdinand Coroniti  
University of California,  
Los Angeles

Dr. Thomas Gaisser  
Bartol Research Foundation  
University of Delaware

Dr. George Gloeckler  
University of Maryland

Dr. Paul T.P. Ho  
Smithsonian Astrophysical  
Observatory

Dr. Frank J. Kerr *(ex officio)*  
USRA and University of  
Maryland, emeritus

Dr. Richard Lingenfelter  
University of California,  
San Diego

Dr. Robert Rosner  
University of Chicago

Dr. Baruch T. Soifer  
California Institute  
of Technology

Dr. Ronald E. Taam  
Northwestern University

**SCIENCE AND  
ENGINEERING  
EDUCATION  
COUNCIL**

Dr. Albert Sheppard  
*(convener)*  
Florida Southern College

Dr. John Foster  
Prairie View  
A&M University

Ms. Elaine R. Hansen  
University of Colorado  
at Boulder

Dr. Juan Homero Hinojosa  
Texas A&M International  
University

Mrs. Susan C. Kemnitzer  
National Science  
Foundation

Mr. Owen Morris  
Eagle Engineering,  
Houston

Prof. Kenneth Peddicord  
Texas A & M University

Mr. John R. Sevier  
*(ex officio)*  
USRA-Division of  
Educational Programs

Dr. Byron D. Tapley  
University of Texas  
at Austin

Dr. David C. Webb  
Embry-Riddle  
Aeronautical University

Dr. Marsha R. Williams  
Tennessee State University

Mr. John B. Winch  
Boeing Defense and  
Space Group, Huntsville

**SCIENCE COUNCIL  
FOR EARTH  
SCIENCES**

Dr. Arthur Few *(convener)*  
Rice University

Dr. George W. Fisher  
The Johns Hopkins  
University

Dr. Robert D. Hudson  
University of Maryland

Dr. Michael Kalb *(ex officio)*  
USRA-GVSP

Dr. Peter J. Lamb  
University of Oklahoma

Dr. Paola Malanotte-Rizzoli  
Massachusetts Institute  
of Technology

Dr. Gerald R. North  
Texas A&M University

Dr. Donald J. Perkey  
*(ex officio)*  
USRA-IGCRE

Dr. William H. Schlesinger  
Duke University

Dr. Ellen Mosley Thompson  
Ohio State University

# USRA OFFICES

---

## **USRA Headquarters**

American City Building, Suite 212  
10227 Wincopin Circle  
Columbia, MD 21044  
(410) 730-2656 • FAX: (410) 730-3496  
*info@hq.usra.edu*

## **USRA Boulder Office**

P.O. Box 391  
Boulder, CO 80306  
(1050 Walnut Street, Suite 212, Boulder, CO 80302)  
(303) 440-9160 • FAX: (303) 440-1421  
*mhdavis@usra@telemail.nasa.gov*

## **Center for Advanced Space Studies**

3600 Bay Area Blvd.  
Houston, TX 77058-1113

**Lunar and Planetary Institute  
Exploration Science Institute**  
(713) 486-2139 • FAX: (713) 486-2162  
*lpi@cass.jsc.nasa.gov*  
*esi@cass.jsc.nasa.gov*

**Division of Space Life Sciences  
Division of Educational Programs**  
(713) 244-2000 • (713) 244-2006  
*dsls@cass.jsc.nasa.gov*  
*dep@cass.jsc.nasa.gov*

## **CESDIS**

Code 930.5  
NASA Goddard Space Flight Center  
Greenbelt, MD 20771  
(Nimbus Road, Bldg. 28, Rm. W223)  
(301) 286-4403 • FAX: (301) 286-1777  
*cas@cesdis1.gsfc.nasa.gov*

## **Dr. Paul J. Coleman, Jr., USRA President**

Institute of Geophysics and Planetary Physics  
University of California, Los Angeles  
Los Angeles, CA 90024-1567  
(310) 825-1776 • FAX: (310) 206-8042  
*pcoleman@igpp.ucla.edu*

## **USRA Goddard Visiting Scientist Program**

### **High-Energy Astrophysics Program Support Office**

#### **On-Site**

Mail Code 610.3  
NASA Goddard Space Flight Center  
Greenbelt, MD 20771  
(301) 286-5057

#### **Off-Site**

7501 Forbes Blvd., Suite 206  
Seabrook, MD 20706-2253  
(301) 805-8396 • FAX: (301) 805-8466  
*gvsp@gvsp.usra.edu*

## **USRA Huntsville Office**

4950 Corporate Drive  
Huntsville, AL 35806

### **MSFC Astronomy and Microgravity, Suite 100**

**JOVE Program, Suite 100**  
(205) 895-0582 • FAX: (205) 895-9222  
*paula@space.hsv.usra.edu*  
*jove@space.hsv.usra.edu*

**IGCRE, Suite 200**  
(205) 895-0662 • FAX: (205) 895-9222  
*igcre@space.hsv.usra.edu*

## **ICASE**

Mail Stop 132C  
NASA Langley Research Center  
Hampton, VA 23681-0001  
(18C West Taylor Street, Bldg. 1192C, Rm. 164)  
(804) 864-2174 • FAX: (804) 864-6134  
*info@icase.edu*

## **RIACS**

Mail Stop T20G-5  
NASA Ames Research Center  
Moffett Field, CA 94035-1000  
(Bldg. T20G, Rm. 110)  
(415) 604-5402 • FAX: (415) 962-7772  
*postman@riacs.edu*

## **USRA Washington Office**

300 D Street, SW, Suite 801  
Washington, DC 20024  
(202) 479-2609 • FAX: (202) 479-2613  
*postman@usra.edu*



Published by USRA Boulder Office  
Editors: M.H. Davis, A. Singy

Design by Gary Moore, G.E. Moore Communications, Inc.  
Layout by Laura Greenhalgh, Evergreen Graphics  
ICASE computer graphic by Dimitri Mavriplis, ICASE  
RIACS computer graphic by Rupak Biswas, RIACS

Printed by March Press, Boulder, Colorado, on recycled paper 